Simplot Responses to Agency Comments (September 5, 2014) on Revision #1 Pilot Study Work Plan and Sampling and Analysis Plan (July 8, 2014) Biological Selenium Removal Treatment Technology, Fluidized Bed Bioreactor

Agency Comment #9 (June 25, 2014): EPA updated analytical methods 6020, and 6010B to 6020A and 6010C, respectively in 2007. Methods 6020 and 6010B are no longer supported in the on-line version of SW- 846. It is recommended that these methods be updated for this work plan.

Simplot's Response (July 8, 2014): The method numbers referenced in Table 3-4 (and now Table 3-5) are consistent with those referenced in the Quality Assurance Project Plan developed for the Smoky Canyon Mine RI and they are also consistent with the method numbers currently referenced by the contracted laboratory. Based on additional comments received regarding quality assurance plans for this project (see below), the water treatment plan has been revised to reference the RI QAPP for project-specific quality assurance guidelines. For these reasons, the 6010B and 6020 method numbers have not been updated in this plan.

Agency Response (August 5, 2014): EPA recommends that QAPPs undergo annual review to identify any changes to analytical methods, guidance documents, etc., that may need updating. The Smoky Canyon RIFS is currently under annual Forest Service review and the above comment will be forthcoming for that document. QAPP's are dynamic documents that should reflect the most up-to-date methods, procedures and guidance policies. As stated in the original comment, EPA updated analytical methods 6020, and 6010B to 6020A and 6010C, respectively in 2007 and methods 6020 and 6010B are no longer supported in the on-line version of SW-846. These updates are seven years old. It is time to update the QAPP, the methods specified for the work for the current project, and for the contract laboratory to update their methods as well. These updates are consistent with other similar projects under CERCLA and other environmental projects for phosphate mines in southeastern Idaho.

Simplot's Response (September 2014): SVL and IAS recently confirmed that they are implementing the updated EPA methods 6010C and 6020A to replace the older EPA methods 6010B and 6020, respectively. The methods in the work plan have been revised to specify use of the updated EPA methods instead of the older methods. The RI QAPP will be updated in a separate submittal to include implementation of these new EPA methods.

Agency Comment #11 (June 25, 2014): There is some confusion in the SAP regarding the proposed level of data quality. As written, it is unclear whether or not the National Functional Guidelines (2010) will be the primary requirement for the relevant analytical methods (6020A, 6010C and 7470A) or if the specific analytical methods will be the primary requirement for associated QA/QC. It is important to understand that only data generated according to the NFG can be validated according to the NFG and that these instructions need to be part of the laboratory contract. Please clarify. It is recommended that the QA/QC be based on the NFG for the relevant analytical methods and that the following hierarchy be followed for the remaining analytical methods, listed in order of importance:

- National Function Guidelines (NFG, where applicable);
- EPA Methods (where applicable and when NFG do not apply);
- This project-specific QAPP, for all other activities specified here; and
- The project-specific-laboratory QAPP for all activities not specified in earlier documents

Simplot's Response (July 8, 2014): In order to eliminate such confusion, the plan has been revised to reference the RI QAPP for the Smoky Canyon Mine site. Any deviations from the data validation specifications included in the RI QAPP have been identified in the revised water treatment plan.

Agency Response (August 5, 2014): See response to #9.

Simplot's Response (September 2014): See response to comment 9.

Agency Comments #21, #23, #24 a) and b), #26, #30, #32, #43, #47 (June 25, 2014): Please revise the document to include the information provided in these responses.

21.) Page 14, last paragraph. The text states "The second stage of the Frontier system consists of a filter media that has an affinity to elemental selenium." Please clarify what material the filter is made of or if it is proprietary.

Simplot's Response (July 8, 2014): It is proprietary.

Simplot's Response (September 2014): The text has been revised to state: "The second stage of the Frontier system consists of a proprietary filter media that has an affinity to elemental selenium." (Section 2.3, paragraph 3).

23.) Page 16, Section 3.0, first paragraph. The text states "This Pilot Study will evaluate the effectiveness of the system in removal of COPCs, including selenium, while treating water combined from Lower South Fork Sage Springs and Hoopes Spring." Removal of other COPCs is also mentioned in the fourth bullet under Study Objectives. Given that in several other sections of this work plan, the text states that selenium is the only COPC to exceed water quality criteria and/or benchmarks at both spring complexes, please clarify the need to include removal of other COPCs as a Study Objective for this project. Please clarify what other COPCs might be expected to be removed by the proposed technology. And, if the concentrations for other COPCs are so low, please explain the utility of evaluating COPC removal at such low concentrations.

Simplot's Response (July 8, 2014): The objectives were consistent with those required by the agencies for previous water treatment pilot studies at the Site. As discussed in Section 2.1, selenium is the only COPC that has recently exceeded water quality standards in water discharging at the springs. However, given that the concentrations have been increasing and that this study is being performed under the RI, Simplot believes it is prudent to assess the full list of RI COPCs.

Simplot's Response (September 2014): The text has been revised to explain the utility of evaluating the full list of RI COPCs (Section 3.0, paragraph 1).

24.) Page 16, Figure 3.1 – PFD.
a) Since the FBR media, by definition, is fluidized, please clarify if some precipitated Se is expected to pass through in the effluent and if so, how much. And if so, please explain if there is the potential for elemental Se in the FBR effluent to be re-oxidized to selenite/selenate due to aeration in the sulfide oxidation reactor.

Simplot's Response (July 8, 2014): The fluidized reactor portion of the Frontier treatment system is followed by the proprietary filter which will capture elemental selenium generated in the fluidized first stage. All treated water is also filtered through the continuously washed sand filter which will remove any residual solids from the treatment system. Water passing through the two-stage FBR system reduces selenium to the elemental state and filters it from the process water. The elemental selenium is flushed from the filter and is captured within the solids handling system. The selenium passing through the FBR system is anticipated to be less than project concentration goals. This will be assessed by the study.

Simplot's Response (September 2014): The description of this process, as described in the previous response, has been added to the text (Section 3.1, paragraphs 8 and 9).

b) The sulfide oxidation tank is depicted as covered but it would seem it must be vented since it's aerated. Please clarify if there is the potential for H2S gas emissions from an operator health & safety perspective and if there some form of monitoring or alarm system planned.

Simplot's Response (July 8, 2014): The Aeration Tank (previously called "sulfide oxidation tank") will be covered and provided a "mushroom" style vent at the top to allow blower air to escape the tank. Full oxidation of sulfides in the Aeration Tank to soluble sulfate ion is anticipated. This should be the first reaction within the oxidation tank with an abundance of available air for the reaction and sufficient hydraulic retention time for the reaction to proceed. We do not expect H2S gas emissions from the vent. As a precaution, a strategically placed H2S monitor will be placed within the building to alarm if the H2S concentration in the building exceeds 10 ppm.

Simplot's Response (September 2014): The text has been revised to include the information provided in the previous response (Section 3.1, paragraph 7).

26.) Page 18, Section 3.1, last paragraph. Please clarify the type of containment (movable floor skid type or a basin type).

Simplot's Response (July 8, 2014): The building is being built as a concrete basin to provide containment. Building containment volume will be approximately 50,000 gallons. All chemical totes and drums at the treatment building will be stored on movable plastic containment pallets which provide full secondary containment as added protection within the containment confines of the building.

Simplot's Response (September 2014): The text has been revised to include the information provided in the previous response (Section 3.1, last paragraph).

30.) Page 19, Section 3.2.3. The text describes that water will overflow back to the creek if demand is less than supply. Describe how this will be controlled. If demand is controlled by way of gravity flow into the gravity HDPE pipe, demonstrate that the HGL will not exceed GL at the downstream pump station.

Simplot's Response (July 8, 2014): The wetwell of the lift station will include a pipe penetration located below the pump base level and located approximately 1 foot below ground level. The overflow pipe will extend from the pump station at minimum

slope. The natural slope of the ground will cause the pipe to "daylight" and discharge to a constructed gravel and riprap lined channel which will extend to the creek edge. The pipe will extend approximately 10 feet at the SF Sage pump station and approximately 15 feet at the Hoopes Spring pump station.

Simplot's Response (September 2014): The text has been revised to include the information provided in the previous response (Section 3.2.3, paragraph 1).

32.) Page 20, Section 3.3. The second sentence indicates that spring water will be used to test the system, and the third sentence indicates that creek water will be used for commissioning. Please clarify if spring water will be used for both testing and commissioning.

Simplot's Response (July 8, 2014): All water delivered to the treatment system for both commissioning and operations will be spring water.

Simplot's Response (September 2014): The third sentence has been revised to state: "Following spring water commissioning, the biological reactors will be seeded and nutrient addition will commence."

43.) Page 25, Table 3-4. The holding time of dissolved selenite and selenate are listed at 2 days. Please identify the analytical method that requires the 2-day holding time or revise to note that the two day holding time is a project specific designation that may not reflect actual stability conditions.

Simplot's Response (July 8, 2014): The method used to analyze selenite and selenite is ion-chromatograpy/ICP-MS. EPA does not designate a specific holding time for this method. Applied Speciation recommends analysis "as soon as practical." The 2-day hold time specified on Table 3-4 (now Table 3-6) is the target established for delivery and preparation of the samples by Applied Speciation.

Simplot's Response (September 2014): The method for these analyses is presented in Table 3-4, and the hold time has been clarified in Table 3-6 as "2 or as soon as practical".

47.) Page 33 (Word Version), Section 5.2.2, 2nd paragraph. The text states "The samples will be shipped via overnight courier to the analytical laboratory [TBD] for analyses with a 48-hour turnaround for total selenium and nitrate to allow for efficient performance adjustments." Please clarify if the holding time for nitrate is 48 hours, including 24 hours for overnight shipment, that leaves only 24 hours for the laboratory to conduct the analysis.

Simplot's Response (July 8, 2014): IAS EnviroChem (IAS) in Pocatello, ID has been selected to perform the 48-hour turnaround nitrate analyses. A courier will transport samples from the Smoky Canyon Mine office to IAS in Pocatello, ID within 24 hours of sample collection. IAS will have at least 24 hours to perform the nitrate analyses.

Simplot's Response (September 2014): The text in Section 6.2.2 has been revised as follows: "Due to the 48-hour hold time for nitrate analyses, the samples will be transported via overnight courier to IAS EnvironChem in Pocatello, Idaho within 24

hours of collection. This will allow the lab 24 hours for analyses which will meet the 48-hour hold time. In addition, the lab will report preliminary total selenium and nitrate concentrations promptly to expedite any corrective actions needed during operation."

Agency Comment #53 (June 25, 2014): This was a two-part comment. The second part of the comment "Also please check the targets and associated methods listed in Table 6-1 to those in Tables 3-3 and 4-1 as there are differences, see other comments on this topic. Revise accordingly."

Simplot's Response (July 8, 2014): Section 6.0 of the Pilot Study Work Plan now refers to the RI/FS QAPP for data quality criteria, and Table 6-1 has been revised to provide a summary of the criteria in the RI QAPP.

Agency Response (August 5, 2014): It is unclear from Simplot's response if the revision now reflects consistency among Tables 6-1, 3-3 and 4-1 as originally requested. Please revise or confirm the changes have been made as requested.

Simplot's Response (September 2014): The tables have been revised to be internally consistent, as requested.

(New) Specific Comments

1) Page 13, Figure 2-4: Please add y-axis title and units.

Response: The figure has been updated with a y-axis title and units.

2) Page 12, Section 2.2: This section is confusing. It is unclear whether or not the previously proposed two-step system of first bringing on-line water from South Fork Sage Creek Springs, and if successful, bringing on additional water from Hoopes Springs, has now been replaced with a two-step system of treating 250 gpm of an influent from a combined flow from South Fork Sage Creek Springs, and if successful, followed by an increase of that combined flow to 1000 gpm or if there is still a plan to treat Hoopes Springs water influent first, followed by scaling up by adding influent from South Fork Sage Creek Springs. This issue is further confused by subsequent text regarding the step 2 addition of a reverse osmosis unit and possibly a second fluidized bed reactor. In addition, the current work plan does not include any information on the RO unit. Please clarify if another work plan or a work plan addendum is envisioned that would provide information on the RO system (example, Figure 3-1, Process Flow Diagram does not include a RO unit or a place holder for an RO unit). Please revise for clarity.

Response: Due to the uncertainty about the flow that will be available from the developed South Fork Sage Creek Springs, the two-step approach previously described has been revised. For clarity, the text has been revised to refer to the 2014 plan (pilot system consisting of only the FBR that will treat 250 gpm from a combined flow of South Fork Sage Creek Springs and Hoopes Spring water), and the 2015 plan (the original FBR system, plus an RO unit that will treat 1,000 to 2,000 gpm).

3) Page 15, Table 2-3: Please add dissolved oxygen to the table. It is also recommended to clarify the effluent BOD requirements in terms of acceptable levels of dissolved oxygen after the BOD test is completed, which for natural water supporting a fisheries should be ≥ 6 mg/L DO.

Response: Dissolved oxygen has been added to Table 2-3. The following footnote has been added: “BOD effluent targets are related to maintaining DO concentrations in the receiving stream. These effluent limits will be assessed further during the pilot study.”.

4) Page 15, 1st objective bullet: Please clarify if this means dissolved selenium since particulate selenium could overflow from the FBR.

Response: The study objective is to evaluate the removal of total selenium. The pilot study is intended to test the effectiveness of the FBR to reduce selenium and the effectiveness of the polishing filters to remove particulate overflow from the FBR. The text has been revised to clarify this.

5) Page 17, Section 3.0, 1st paragraph: Recommend using “particularly selenium” rather than “Including”, since selenium is really the only principal constituent targeted for treatment.

Response: The text has been revised as recommended.

6) Page 18, last paragraph: It is unclear what is meant by “backwashing” the FBRs. There appears to be no back (counter-current) flow. Please clarify if this means forward flushing to allow liquid to flow out the top to the dirty backwash tank. The next paragraph on P. 19, says the baffled area in the Aeration Tank will “…be the source of backwash water for the FBRs”, but the PFD doesn’t show this. Please clarify.

Response: The following text has been added to more accurately describe the FBR backwash cycle: “The pumps that pull water from the FBRs and deliver it to the Aeration Tank can be operated in reverse. During the backwash cycle, treated water is pumped from the Aeration Tank to the FBR. The Aeration Tank inlet is baffled to prevent aerated water being pumped to the FBR.”

7) Page 24, last paragraph and Page 25, Section 3.3.2, 1st paragraph: It is unclear on page 24 if the influent and effluent will be monitored with in-line probes with continuous readout and data recording as indicated later on page 25. If not, please revise to include. Additionally, the monitoring parameters appear to be inconsistent between these two sections (page 24 does not include DO for influent, but page 25 does, page 24 does not include ORP for effluent, but page 25 does). Please revise for consistency and ensure that dissolved oxygen is a monitored parameter for the influent.

Response: The description of the in-line probes has been revised to better describe the probes that will be associated with specific aspects of the pilot system (Section 3.3, paragraph 4). Specifically, the following parameters will be monitored continuously:

- Inlet – flow, pressure, temperature, pH, ORP and DO
- FBR effluent – pH, ORP and DO
- System effluent – temperature, pH, ORP, and DO

8) Page 24, paragraph below Table 3-2: ORP is oxidation-reduction potential, not "oxygen reduction potential". Please change. A target ORP range of 0 to -250 mV is quite wide; hopefully this can be narrowed considerably with operating experience.

Response: The text has been revised as requested. The ORP range will be optimized during startup as described in Section 3.3, paragraph 3.

9) Page 25, 1st full paragraph: Typo "120 days months…" Expect that months should be deleted, although not enough information is given to follow the calculations. The 120 gpd of sludge at 2% solids is not really the critical factor for the tank capacity, without knowing the total anticipated backwash volume. Please clarify.

Response: The typo has been corrected as requested. Nomenclature for the backwash cycle has been revised to more accurately describe the various tanks involved (Section 3.0, paragraphs 5 and 6). The volume of backwash water (800 to 3,400 gallons per cycle) will be collected in a cone-bottomed settling tank. The clarified water in the settling tank will be decanted and reprocessed through the FBRs. The settled solids will be pumped from the settling tank to a sludge storage tank. The estimate of 120 gpd of 2% solids was used to size the sludge storage tank as that will be a continuous draw off the bottom of the settling tank.

10) Page 25, 2nd bullet under Sec. 3.3.1: Recommend revising. Maintaining a "healthy biomass" is not the intended objective. The intent of carbon source dose optimization is normally to maximize Se reduction (removal of dissolved Se) while minimizing superfluous sulfate reduction (sulfide production).

Response: The text has been revised to state: "Nutrient feed rates to optimize removal of dissolved selenium while minimizing sulfide production;"